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(54) IMPROVEMENTS IN AND RELATING TO SEALS FOR SEALING THE GAPS BETWEEN JUXTAPOSED SURFACES

(71) I, FRANK HENRY HALLS, a British subject, of 28 Margetts, Hemmingford Grey, Huntingdonshire, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to improvements in methods of sealing the gaps between juxtaposed surfaces and in seals for sealing such gaps.

According to one aspect of the present invention there is provided a seal for sealing the gap between juxtaposed surfaces comprising a generally planar resiliently flexible strip provided on one face with at least four resiliently flexible ribs extending outwardly from the face and longitudinally of the strip, a pair of the ribs lying to each side of and positioned symmetrically relative to the central longitudinal axis of the strip and at least one of each pair of ribs extending from the strip in a direction inclined to the general plane of the strip, that face of the seal opposite to the one face of the strip being generally planar, wherein the strip is resiliently deformable to a generally U-shape with the one face outermost by bending about the central longitudinal axis of the strip and to be positioned in a gap between juxtaposed surfaces with the ribs resiliently deformed into sealing contact with the juxtaposed surfaces.

According to another aspect of the present invention there is provided a method of sealing the gap between juxtaposed surfaces, the method comprising resiliently deforming a strip as above described into a U-shape by bending the strip about the longitudinal central axis thereof with the said face outermost and inserting the strip into the gap to be sealed, the ribs making sealing contact with the juxtaposed sur-

faces.

Advantageously the ribs closest to the longitudinal central axis of the strip extend from the strip and towards each other and the outer ribs extend from the strip and away from each other.

The strip may be planar or may be curved in a plane transverse to the longitudinal central axis.

The present invention has particular application for sealing joints between concrete or wood blocks or slabs whether the faces to be sealed extend horizontally or vertically. The invention is not however limited to such application.

By virtue of the resilience of the sealing strip, it can be used to great advantage where movements may occur of one juxtaposed surface relative to the other. Additionally, one width of sealing strip can be used for a relative wide range of gap widths.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figures 1, 2 and 3 are transverse sectional views through three embodiments of sealing strips according to the present invention;

Figures 4 and 4a are sectional views of sealing strips in use;

Figures 5 and 5a are side views of tools for use in inserting a sealing strip;

Figures 6 and 6a are end views of the tools of Figures 5 and 5a respectively;

Figure 7 is a diagrammatic perspective view showing a method of sealing a cruciform gap, and

Figure 8 is a diagrammatic perspective view of a sealed cruciform gap.

As shown in Figures 1 to 3 the sealing strip 1, which is made of a resiliently flexible material such as a polymer or a material including a polymer, is generally

planar, and within the generality of the foregoing, may be planar (Figures 1 and 2) or slightly curved (Figure 3). The strip is provided on one face with eight flexible ribs 7 to 14 which are symmetrically positioned on the strip relative to the central longitudinal axis of the strip. The two innermost ribs 10, 11 of Figures 1 and 2 extend away from the strip in converging directions whilst the ribs 7 to 9 and 12 to 14 respectively of Figures 1 to 3, extend away from the strip in respective diverging directions, for reasons which will become apparent hereafter. The ribs 7 to 9 and 12 to 14 of each of the embodiments of Figures 1 to 3 and the ribs 10, 11 of each of the embodiments of Figures 1 and 2 extend from the general plane of the respective strips in directions making acute angles with the respective general planes.

In use, as shown in Figure 4, the strip is resiliently deformed into a U-shape between the two juxtaposed surfaces 2, 3 to be sealed. The surfaces are "stepped", as shown in Figures 4 and 4a, and the ribs 10, 11 are resiliently pressed against the step surfaces 15, 16 while the ribs 7 to 9 and 12 to 14 are resiliently pressed against the parallel surfaces 2, 3. In this manner, the strip provides a good seal from both sides of the gap, the ribs 7, 14 providing the initial seal from one side of the gap and the ribs 10, 11 from the other side of the gap.

The strip may be provided with a single longitudinally extending notch 4, 5 (see Figures 1 and 2) in one or both of its faces for relieving stress in the surface at the apex 6 of the U of the strip in use. Alternatively, two or more longitudinal notches may be provided at and/or to either side of the apex 6.

The ribs are spaced such that irregularities or faults in the surfaces are bridged thereby, and capillary breaks allowing dead air spaces are provided therebetween. Although the strip as described is provided with eight ribs, four ribs positioned in pairs to either side of the longitudinal central axis of the strip should provide an adequate seal.

The strip may be inserted into a gap using the tool shown in Figures 5 and 6. The tool comprises a handle 18 and a pre-formed shoe 19 which is pushed by the operator against a strip placed along a gap to be sealed, and advanced with a rocking motion along the strip thereby gradually introducing the strip into the gap.

In Figure 4a the strip is located in opposed recesses formed by the step surfaces 15, 16 and step surfaces 42, 43. These latter surfaces increase the sealing action of the strip by protecting the ribs 7, 14 from direct exposure to the atmosphere. Furthermore, with this configuration of the sur-

faces 2, 3 to be sealed, the strip can not be accidentally removed.

Alternatively, the strip may be inserted into a gap using the tool shown in Figures 5a and 6a and comprising a wheel 45 rotatably mounted between the arms of a U-shaped support 46 on which a handle 47 is mounted. The profile of the wheel 45 conforms to that of the deformed strip, the shoulders 48 bearing on the ribs 7, 14.

When it is required to seal a cruciform joint between four blocks, of which only two, 34, 35, are shown in Figures 7 and 8, one through joint is sealed by a continuous length of strip 36 and the intersecting joint is sealed by two pieces of strip 37, 38 whose ends are cut to abut and follow the contour of the strip 36. The junction of the strip 37, 38 with strip 36 is sealed by pulling in first one and then the other part of the strip 36 at the junction, using a hooked tool 23, to expose the ends of strips 37 and 38 and the surface 24 of strip 36 to be sealed. A suitable sealant is then injected into the spaces from a container provided with a nozzle 26. The strip 36 is released from the hook to return to its original configuration and, by suitable rolling action using the tool of Figures 5, 6, or the tool of Figures 5a, 6a, the sealant is forced into the four critical parts 28, 29, 30, 31 of the junctions, excess sealant forming beads 32 and 33 at the bases of the U-channel of the strips 37, 38.

WHAT I CLAIM IS:—

1. A seal for sealing the gap between juxtaposed surfaces comprising a generally planar resiliently flexible strip provided on one face with at least four resiliently flexible ribs extending outwardly from the face and longitudinally of the strip, a pair of the ribs lying to each side of and positioned symmetrically relative to the central longitudinal axis of the strip and at least one of each pair of ribs extending from the strip in a direction inclined to the general plane of the strip, that face of the seal opposite the one face of the strip being generally planar, wherein the strip is resiliently deformable to a generally U-shape with the one face outermost by bending about the central longitudinal axis of the strip and to be positioned in a gap between juxtaposed surfaces with the ribs resiliently deformed into sealing contact with the juxtaposed surfaces.

2. A seal according to claim 1, wherein the ribs furthest from the central longitudinal axis of the strip extend from the strip in diverging directions.

3. A seal according to either claim 1 or claim 2, wherein the ribs closest to the central longitudinal axis of the strip extend from the strip in converging directions.

4. A seal according to any of the preceding claims, wherein the strip is provided with an equal number, greater than two, of ribs lying to each side of the central longitudinal axis of the strip and all but the one rib closest to the central longitudinal axis of each number of ribs extend from the strip in respective diverging directions.
5. A seal according to any of the preceding claims wherein the strip is planar.
6. A seal according to any of claims 1 to 5 wherein the strip is slightly curved in a plane perpendicular to the central longitudinal axis.
7. A seal according to any of the preceding claims wherein the strip is provided with at least one groove in one face thereof and extending longitudinally of the strip in the region of the central longitudinal axis thereof.
8. A seal substantially as herein described with reference to the accompanying drawings.
9. A method of sealing a gap between juxtaposed surfaces, the method comprising resiliently deforming a seal according to claim 1 into a U-shape by bending the strip about the central longitudinal axis thereof with the one face outermost and inserting the strip into the gap to be sealed 30 with the ribs resiliently deformed into sealing contact with the juxtaposed surfaces.
10. A method according to claim 9 wherein the juxtaposed surfaces are stepped and the seal is inserted therebetween 35 with the ribs closest to the central longitudinal axis sealing against the step.
11. A method according to claim 9 wherein the juxtaposed surfaces are provided with corresponding recesses and the seal is inserted into the recesses with the ribs closest and furthest from the central longitudinal axis sealing against opposite end faces of the recesses.
12. A method according to any of claims 9 to 11 wherein the seal is deformed as it is inserted into the gap by an inserting tool which is brought to bear on the seal in the region of the central longitudinal axis thereof.
13. A method according to claim 9 substantially as herein described.
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COMPLETE SPECIFICATION

3 SHEETS

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Sheet 1

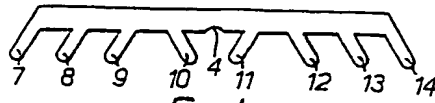


FIG. 1.

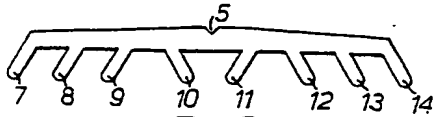


FIG. 2.

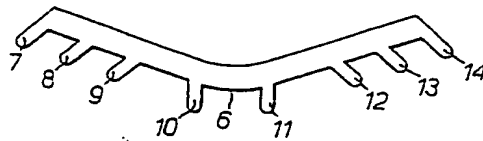


FIG. 3.

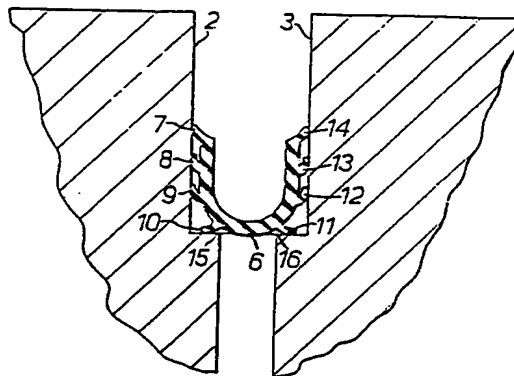


FIG. 4.

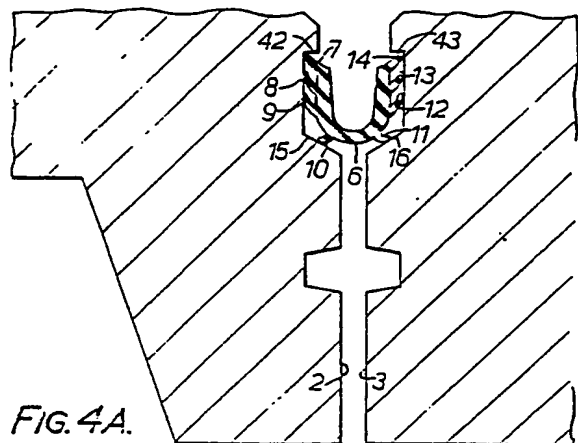


FIG. 4A.

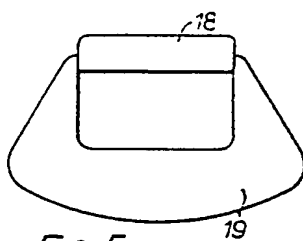


FIG. 5.



FIG. 6.

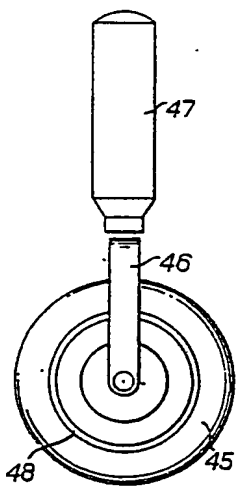


FIG. 5A.

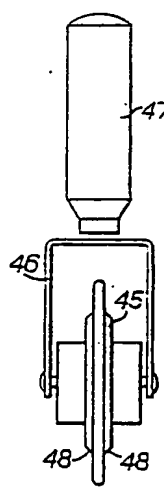


FIG. 6A.

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3 SHEETS

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Sheet 3

